REMARKS

The Office Action dated August 29, 2007 has been reviewed and carefully considered. Claims 1-13 remain pending in the application, with claims 1 and 10 being the only independent claims. Reconsideration of the above-identified application in view of the following remarks is respectfully requested.

Claims 1-6, 10 and 12 stand rejected under 35 USC 102(b) as being anticipated by Neukermans et al., U.S. Patent No. 5,629,790 (Hereinafter "Neukermans"). Claims 7 and 13 stand rejected under 35 USC 103(a) as being obvious over Neukermans. Claims 8 and 9 stand rejected under 35 USC 103(a) as being obvious over Neukermans in view of Bard et al., U.S. Patent No. 5,486,944. Claim 11 stands rejected under 35 USC 103(a) as being obvious over Neukermans in view of Conemac, U.S. Patent No. 6,226,126.

The present invention relates to a two dimensional scanner which combines a pair of torsion elements, which provide deflection about one axis; with a cantilever beam, which provides deflection about a second axis. In particular, claim 1 recites:

A two dimensional scanning device, for use in a projecting display, comprising a surface (43; 53) suspended by at least two torsion elements (49; 55) defining a torsion axis (B), and a first actuator (45, 46, 47; 60, 61) for pivoting said surface (43; 53) around said torsion axis (B), characterized by
- a cantilever beam (41; 51) having one end fixed in relation to said surface and an opposite end arranged to bend around a bending axis (A) non-parallel to said torsion axis (B),
- a reflective surface (31; 34) provided on said cantilever beam (41; 51), and
- a second actuator (48; 58) for bringing said cantilever beam to oscillate at its resonance frequency.

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As described in paragraph [0029] of the published application, "the scanning device 13 comprises two one-dimensional scanners; a first, slow scanner, provided with a second, fast scanner. The first scanner is a torsion scanner, and comprises a plate-shaped area suspended from the surrounding material by two bars or springs. By actuating the plate using suitable actuator, the plate can be brought to pivot around the axis defined by the bars. The second scanner is a cantilever scanner, and comprises a cantilever beam provided with a mirroring surface attached in one end to a substrate. By actuating the beam using a suitable actuator, the beam will **bend around an axis perpendicular to its lengthwise extension** [emphasis added], and can be brought to oscillate at its resonance frequency." This perpendicular axis of rotation is clearly illustrated in Figs. 2-3 (and is further described in corresponding paragraph [0030] of the published application).

Neukermans teaches "a frequency-locked torsional scanner of the type having a micro machined mirror formed on a surface of a silicon wafer section supported within a larger wafer section by **a pair of opposed torsion bars**" [emphasis added] (Abstract). That is, Neukermans simply teaches combining two torsion scanners. Fig. 12a illustrates these two pairs of torsion bars (items 205 and 209) which are also described as such at col. 10, lines 12-17 of Neukermans' specification. The present application briefly discusses the dual torsion scanners of Neukermans and the problems inherent in that design which the present application seeks to overcome (paragraph [0006] of the published application).

Paragraph 8 of the Office Action points to Figs. 12a and 12b of Neukermans as teaching the features of claim 1. In particular, paragraph 8c recites "a cantilever beam ((203), (205), and (207)) having one end fixed in relation to the surface and an opposite

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end arranged to bend around a bending axis non-parallel to the torsion axis." Applicant respectfully disagrees. Item 203 is a mirror and item 207 is the surface suspended by torsion elements 209. The remaining element 205 is also a "torsion bar" (col. 10, line 13) – not a cantilever beam as claimed by the present invention.

As illustrated in Figs. 2-3 of the present invention, a cantilever beam inherently has a bending axis perpendicular to its lengthwise extension. Assuming arguendo that items 205 appearing in Fig. 12a are cantilever beams (and momentarily ignoring the fact that this assumption is clearly contradictory to Neukermans defining these to be torsion bars), the resulting structure will not function as a two dimensional scanner. "Cantilever beams" 205 would pivot in a direction that is perpendicular to their length – about the x-axis depicted in Fig. 12a. As an initial matter, such pivoting cannot take place when item 203 is secured by two opposed 205 items as illustrated. That is, each 205 beam will prevent the rotation "caused" by the other. Further, if items 205 were somehow functional as cantilever beams, Fig. 12a now lacks any means to pivot about the y axis – contrary to Neukermans invention. Still further, as cantilever beams, the bending axis of item 205 would be parallel to the bending axis of torsion axis of items 209. This is contrary to the language of claim 1 wherein the bending axis (A) of the cantilever beam is "non-parallel to said torsion axis".

The Office Action has addressed the above arguments by stating that "torsion bars" and cantilever beams" are "art-recognized equivalents" (Page 7, last paragraph). Applicant respectfully disagrees, at least with respect to the present application. Clearly these elements have different properties and functionality. In particular, they have a different axis of rotation relative to their longitudinal (lengthwise) axis. That is, torsion

bars 209 of Fig. 12a rotate about the x axis and <u>torsion</u> <u>bars</u> 205 rotate about the y axis. It is this physical property of torsion bars that results in Fig. 12a functioning as an x-y scanner.

As depicted in Fig. 2, a cantilever scanner's axis of rotation A is essentially perpendicular to its length. This figure and the accompanying description at paragraph [0030] depict well-known properties of a cantilever scanner. The Office Action's interpretation of items 205 as being cantilever beams would require the axis of rotation of the cantilever 20 to be perpendicular to axis A. This is clearly not the case. Moreover, it would require pivoting the length 21 when one end of it is attached to base 22, thereby restricting such a pivoting motion.

The Office Action (Page 8, 1st paragraph) argues that "element 203, joins the two 205. elements into one single piece, or cantilever" and that this reads on the claim language. However, each element 205 is joined to element 207 at one end and element 203 at the other. Accordingly, interpreting item 205 to be a cantilever is contrary to the accepted definition of a cantilever (e.g. "A cantilever is a beam supported on <u>only</u> one end" [emphasis added], (www.wikipedia.com)). Further, for the reasons given above, this cannot be a cantilever for it would result in a structure that does not function as a two-dimensional scanner. Moreover, the claim language itself recites "a cantilever beam (41; 51) having <u>one end fixed</u> in relation to said surface and <u>an opposite end arranged to</u> <u>bend</u> around a bending axis (A)." The Office Actions reading of Fig. 12a would have both ends fixed - thus preventing bending around axis A. Accordingly, items 205 are not and cannot be cantilever beams and Fig. 12a does not read on the language of claim 1.

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For at least the reasons stated above, Neukermans fails to teach the feature of claim 1 wherein a cantilever beam, fixed in relation to the surface suspended by at least two torsion elements defining a torsion axis, is arranged to bend around a bending axis (A) non-parallel to said torsion axis.

A claim is anticipated only if each and every element recited therein is expressly or inherently described in a single prior art reference. Neukermans cannot be said to anticipate the present invention, because Neukermans fails to disclose each and every element recited. As shown, Neukermans fails to disclose the limitation of a cantilever beam having a bending axis non-parallel to the torsion axis. Claim 10 contains a similar feature and is patentable over Neukermans for at least the same reasons.

Having shown that Neukermans fails to disclose each and every element claimed, applicant submits that claims 1 and 10 are allowable over Neukermans. Applicant respectfully requests reconsideration, withdrawal of the rejection and allowance of claims 1 and 10.

With regard to claims 2-9 and 11-13, these claims ultimately depend from one of the independent claims, which have been shown to be not anticipated and allowable in view of the cited references. Accordingly, 2-9 and 11-13 are also allowable by virtue of their dependence from an allowable base claim.

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For all the foregoing reasons, it is respectfully submitted that all the present claims

are patentable in view of the cited references. A Notice of Allowance is respectfully

requested.

Respectfully submitted,

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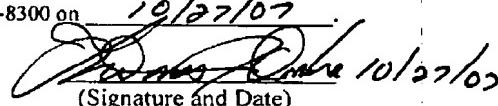Date: October 27, 2007
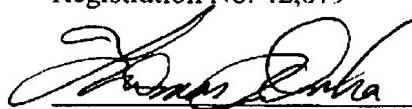
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